<u>AMENDMENTS TO THE CLAIMS</u>

1. (Currently Amended) A steering assistance controller for the generation of a compensating torque which assists a vehicle driver in overcoming the tendency of a vehicle to oversteer, the controller comprising:

a steering controller adapted to be connected to the vehicle steering system, said controller operative <u>during a steering maneuver</u> to encourage the driver to steer the vehicle back to a non-oversteering condition through the application of the compensating torque, said compensating torque being arranged to be based at least in part upon vehicle state information.

2. (Previously Amended) A steering assistance controller as claimed in claim 1, wherein said vehicle state information is comprised of at least one of vehicle yaw rate, lateral acceleration, vehicle side slip, longitudinal velocity, lateral velocity, steering wheel angle, steering wheel velocity, driver applied steering torque and yaw acceleration.

3. (Previously Amended) A steering assistance controller as claimed in claim 1, wherein said steering controller is adapted to derive the estimation of the tendency of the vehicle to oversteer based upon estimates of vehicle yaw rate which are compared with measurements of actual vehicle yaw rate to provide a yaw rate error which is used as a measure of oversteer present on the vehicle.

4. (Previously Amended) A steering assistance controller as claimed in claim 3, wherein said steering controller includes a closed loop observer having yaw rate feedback which is arranged such that, when the vehicle starts to oversteer, a non-linear region is entered and the previously existing linear estimate diverges from the feedback signal whereby the magnitude of the vehicle yaw rate is greater than the magnitude of the estimated yaw rate, thereby producing a negative yaw rate error which is used to generate a proportional signal indicative of the magnitude of the oversteer.

5. (Currently Amended) A steering assistance controller as claimed in claim 1, wherein said steering controller receives a pair of acceleration measurements from a first lateral acceleration ~~sensors~~ sensor placed in the front axle of the vehicle and a second lateral acceleration sensor placed in the rear ~~axles~~ axle of the vehicle and further wherein said steering controller is adapted to derive the estimation of the tendency of the vehicle to oversteer using said measurements from said first and second lateral acceleration sensors.

6. (Currently Amended) A steering assistance controller as claimed in claim 5, wherein said steering controller includes a phase detection device and further wherein signals corresponding to the lateral accelerations measured at the front and rear axles are passed through said phase detection device, said phase detection device being operable to determine a phase difference between said measurements from said first and second lateral acceleration sensors with [[the]] said phase difference being used for calculation of the magnitude of oversteer.

7. (Previously Amended) A steering assistance controller as claimed in claim 6, wherein the state of the vehicle is formed from $\lambda = \Theta_{th} - \Theta$;
where λ is the vehicle state, Θ_{th} is a phase lag threshold and Θ is the phase difference between said two lateral acceleration sensors, positive values of λ indicating that the vehicle is in oversteer and λ is proportional to the amount of oversteer present.

8. (Currently Amended) A steering assistance controller as claimed in claim 1, wherein said steering controller is operative to derive an estimation of the tendency of the vehicle to oversteer based upon [[two]] a first vehicle ~~models~~ model representing an understeering vehicle and a second vehicle model representing an oversteering vehicle which are compared to provide an indication of vehicle oversteer magnitude.

9. (Currently Amended) A steering assistance controller ~~as claimed in claim 8,~~

~~wherein~~ for the generation of a compensating torque which assists a vehicle driver in overcoming the tendency of a vehicle to oversteer, the controller comprising:

a steering controller adapted to be connected to the vehicle steering system, said controller operative to derive an estimation of the tendency of the vehicle to oversteer based upon two vehicle models representing an understeering and oversteering vehicle which are compared to provide an indication of vehicle oversteer magnitude with a difference in dynamics between said two models [[is]] being achieved by altering the [[tyre]] tire cornering stiffnesses in the models, reducing the front [[tyre]] tire stiffness in one model creating an understeering vehicle and reducing the rear [[tyre]] tire stiffness in the other model creating an oversteering vehicle, and further including comparators which calculate the error between the measured lateral acceleration and estimated lateral acceleration at that axle for each model, based on:

$$\lambda_f = | A_{fm} - A_{fu} | - | A_{fm} - A_{fo} | ;$$

$$\text{and } \lambda_r = | A_{rm} - A_{ru} | - | A_{rm} - A_{ro} | ;$$

where:

A_{fu} = Front Axle Lat Acc Estimated from Understeer Model

A_{ru} = Rear Axle Lat Acc Estimated from Understeer Model

A_{fo} = Front Axle Lat Acc Estimated from Oversteer Model

A_{ro} = Rear Axle Lat Acc Estimated from Oversteer Model

A_{fm} = Front Axle Lat Acc Measured from a Sensor

A_{rm} = Rear Axle Lat Acc Measured from a Sensor;

this giving two values for the vehicle state which are added together to produce an overall vehicle stability factor λ, as given by the relationship:

$$\lambda = \lambda_f + \lambda_r$$

where positive values of which are indicative of vehicle oversteer, said controller further operative to encourage the driver to steer the vehicle back to a non-oversteering condition through the application of the compensating torque.

10. (Currently Amended) A steering assistance controller as claimed in claim 1, wherein said steering controller is operative to derive an estimation of the tendency

of the vehicle to oversteer based upon a percentage of the VSC threshold at which brake intervention in oversteer occurs such that the steering assistance controller is actuated before the VSC.

11. (Cancelled)

12. (Cancelled)

13. (Currently Amended) A steering assistance controller ~~as claimed in claim 12, wherein~~ for the generation of a compensating torque which assists a vehicle driver in overcoming the tendency of a vehicle to oversteer, the controller comprising:

a steering controller adapted to be connected to the vehicle steering system, said controller operative detection that the vehicle is in an oversteer condition to control the steering by applying a pulse input that generates a "nudge" to indicate to the driver the correct time and direction to apply steering control, said steering controller also ~~includes~~ including a nudge controller that generates a signal if the vehicle yaw rate error is detected to be greater than a predetermined threshold, this signal being used to trigger a latch, the output of which sets an integrator ramping, said signal also being used to generate a torque demand signal which is fed to the vehicle steering system to initiate the start of [[the]] said "nudge", saturation of the integrator resetting the latch and ending [[the]] said "nudge".

14. (Previously Amended) A steering assistance controller as claimed in claim 1 wherein said steering controller is operative to control the steering by means of closed loop control of the steering wheel velocity upon detection that the vehicle is in an oversteer condition.

15. (Previously Amended) A steering assistance controller as claimed in claim 14, wherein said steering controller includes first and second PD controllers with said first PD controller implemented on the vehicle yaw rate error to generate a steering

rate demand which is compared with a scaled version of the steering wheel velocity to produce an error signal, said second PD controller being responsive to said error signal to generate a signal which attempts to move the steering wheel with a desired direction and velocity to correct the oversteer.

16. (Previously Amended) A steering assistance controller as claimed in claim 1, wherein said steering controller includes an activation controller which is operative to fade said steering controller in when said activation controller has determined that the oversteer has exceeded limits and to fade said steering controller out once the oversteer has returned to an acceptable value.

17. (Previously Amended) A steering assistance controller as claimed in claim 16, wherein said activation controller comprises activation logic which is adapted to control the point at which said steering controller starts, deactivation logic which detects conditions for deactivation of said steering controller, and a fade control which fades the inputs and outputs from said steering controller in and out as said steering controller is switched on and off.

18. (Previously Amended) A steering assistance controller as claimed in claim 17, wherein said activation logic comprises a threshold oversteer value and a latch arranged such that when the oversteer signal exceeds the threshold, the latch is set and remains set until a deactivation flag triggers a reset.

19. (Previously Amended) A steering assistance controller as claimed in claim 17 wherein said activation controller comprises an integrator which, upon detection of an activation flag being high, is operative to ramp up to allow the torque generated by the steering controller to be gradually added to the steering system, but which, on detection of the activation flag becoming low, ramps down to gradually remove the torque generated by the steering controller from the steering system.